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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,534	10/18/2001	Isaac Ostrovsky	265/222	8068

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EXAMINER

CONNOLLY, PATRICK J

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 11/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/017,534

Applicant(s)

OSTROVSKY ET AL.

Examiner

Patrick J Connolly

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Response to Arguments***

Applicant's arguments filed September 22, 2003 have been fully considered but they are not persuasive.

Regarding the rejection of claims 1-63, the applicant has argued that U.S. Patent 5,943,133 to Zeylikovich does not disclose the limitation of a "second sample light beam". What the applicant refers to as a "second sample light beam" is the reflected light from the sample. Zeylikovich clearly discloses sending a reflected light beam from the sample to a detector for analysis.

Zeylikovich also discloses a diffracted reference light beam (see Figures 1 and 2) and combining the reference and sample light beams for detection through the use of beamsplitters.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 58 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 5,943,133 to Zeylikovich et al (hereafter Zeylikovich).

As to claims 1 and 58, Zeylikovich discloses an apparatus and method of using including (see Figure 1, also column 4):

a low coherence light source (see column 5, lines 7-8 and Figure 29, diode laser);

a first beam splitter (BS1);

a diffraction grating (11);

a second beam splitter (BS2); and

a detector (23).

As to claim 3, Zeylikovich discloses a reflective diffraction grating (see column 4, lines 31, 32).

As to claim 4, Zeylikovich discloses a multi element photo detector (see for example Figure 6, 34).

As to claim 5, Zeylikovich discloses a signal processor (25).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21, 22, 24, 25, 29, 30, 32, 35, 37, 38, 41, 43, 44, 47 48, 60 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,943,133 to Zeylikovich et al.

As to claims 21 and 22, Zeylikovich teaches using fibers to transport light (see lines 30-40, also Figures 29, 30).

As to claims 24, 35, 37 and 60, the use of focusing and conjugating lenses and collimators are notoriously well known in the art and it would have been obvious to one of ordinary skill in the art at the time of invention to include such optics in the apparatus of Zeylikovich.

As to claim 25 and 44, Zeylikovich teaches a reflective diffraction grating (see column 4, lines 31, 32).

As to claim 29 and 43, Zeylikovich teaches a phase modulator (see Figure 6, AOM, also column 7, first paragraph).

As to claim 30, 47 and 55, Zeylikovich teaches a signal processor (25).

As to claim 31 and 48, Zeylikovich teaches using a pulsed laser (see column 1, also Figure 1).

As to claims 32, 38 and 54, Zeylikovich teaches a multi element photo detector (see for example Figure 6, 34).

As to claim 41, interferometers that use a light source with a wavelength band that induces fluorescence are notoriously well known in the art and it would have been obvious to one of ordinary skill in the art at the time of invention to include such a light source in the apparatus of Zeylikovich if the fluorescent properties of the sample were of interest.

As to claim 63, Zeylikovich teaches measuring a biological tissue (see column 1)

As to the claims above, it would have been obvious to one of ordinary skill in the art at the time of invention to combine various elements from the various embodiments of Zeylikovich's apparatus, as the advantages of these elements are well known and taught within the specification of Zeylikovich.

Claims 2 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeylikovich as applied to claim 1 above, and further in view of "Nonmechanical grating-generated scanning coherence microscopy" by Zeylikovich et al (hereafter "Nonmechanical ...").

As to claims 2 and 20, while U.S. Patent No. 5,943,133 to Zeylikovich et al teaches diffracting both the reference and the sample light beams, "Nonmechanical ..." teaches a similar interferometer for optical coherence-domain reflectometry diffracting only the reference beam. It would have been obvious to one of ordinary skill in the art at the time of invention to configure the apparatus of U.S. Patent No. 5,943,133 to Zeylikovich to only diffract the reference beam in the manner taught in "Nonmechanical ...".

Claim 6-8 and 16-18, 39, 40, 53, 56 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,943,133 to Zeylikovich as applied to claim 1 above, and further in view of U.S. Patent No. 5,459,570 to Swanson et al (hereafter Swanson).

As to claims 6, 7, 39, 40, 53, 56 and 57, Swanson teaches an optical coherence domain reflectometer including (see Figure 6):

two detectors (42C, 42D); and

polarization filters positioned to filter a first and second combined beams respectively with respect to respective polarizations (116)

It would have been obvious to one of ordinary skill in the art to configure the apparatus of Zeylikovich to include the polarization analysis of Swanson.

As to claim 8, it would have been obvious to one of ordinary skill in the art at the time of invention to have both detectors be multi-element detectors as Zeylikovich already discloses a single multi-element detector (see above).

As to claims 16-18 and 40, Swanson teaches an optical coherence domain reflectometer including (see Figure 3, column 10, lines 12-17):

two low coherence light sources (12A and 12B); and

two multi-element detectors positioned to receive combined light beams, each detector configured to detect light at a respective wavelength of the sources (42).

It would have been obvious to one of ordinary skill in the art to configure the apparatus of Zeylikovich to include the wavelength analysis of Swanson.

Claims 9-12, 13-15, 23, 26-27 34, 36, 45, 46, 49-52, 58, 59, 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,943,133 to Zeylikovich as applied to claim 1 above, and further in view of U.S. Patent No. 6,143,003 to Tearney et al (hereafter Tearney).

As to claims 9-12, 14, 15, 26-27, 34, 36, 42, 49-52, 58, 59, 61 and 62, Tearney teaches a method and apparatus for performing optical coherence tomography including an interferometer (see Figure 3, column 6, lines 15-25). In the interferometer, Tearney teaches that the optical couplers (acting as beam splitters) do not have to divide radiation equally. Tearney goes on to explain that the division of radiation should be determined by noise limitations. It would have been obvious to one of ordinary skill in the art at the time of invention to choose a combination beamsplitters of different proportions in the apparatus of Zeylikovich in order to improve measurements.

As to claims 13 and 33, Tearney teaches using optical circulators to direct light beams (Figure 3, 30). Optical circulators are notoriously well known in the fiber art. It would have been obvious to one of ordinary skill in the art at the time of invention to include circulators for light direction in the apparatus of Zeylikovich.

As to claims 28, 45, and 46, Tearney teaches using attaching an interferometer to a catheter (see Figure 12, also column 12). It would have been obvious to one of ordinary skill in the art at the time of invention to attach a catheter to the apparatus of Zeylikovich (see also column 1 of Zeylikovich).

### ***Conclusion***



**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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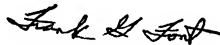
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J Connolly whose telephone number is 703.305.4397. The examiner can normally be reached on 9 am-5.30 pm ... Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 703.308.4881. The fax phone numbers for the organization where this application or proceeding is assigned are 703.746.7722 for regular communications and 703.746.7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0956.

pjc/pj  
November 14, 2003



Frank G. Font  
Supervisory Patent Examiner  
Technology Center 2800